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(54) **HYPOTHESIS SELECTION FOR EVIDENTIAL REASONING SYSTEMS**

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(57) **ABSTRACT**

A method for the selection of hypotheses for modeling physical phenomena, includes detecting if selected features are present by analyzing actual sensed data and parameter values of an initial physical phenomena model; comparing feature estimating hypotheses to the actual data for determining a belief probability assignment value (bpa) for each of the hypotheses which indicates the likelihood that the selected features exist in the actual data and the likelihood that such selected features cannot accurately be determined as existing due to the presence of noise; selecting a set of the hypotheses most accurately modeling the physical phenomena based on the bpa of each selected hypotheses meeting a predetermined criteria; generating evidential support values and lack of evidential support values for subsets of the set having non-zero subset bpa's; ranking the subsets having non-zero subset bpa's in order of decreasing subset bpa; unioning subsets of the power set for forming unioned subsets and determining support values and plausibility values for the unioned subsets; comparing the unioned evidential support values to a predefined threshold value; and using at least one of the unioned subsets having a unioned evidential support value most closely approximating or exceeding the threshold value for selecting alternate models having selected features which more closely approximate the actual data.

27 Claims, 9 Drawing Sheets